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SCREENING AGAINST MUNG BEAN YELLOW VEIN MOSAIC AND RUST DISEASE IN COWPEA UNDER NATURAL CONDITIONS

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Abstract

In the present investigations 87 genotypes of cowpea were screened against mung bean yellow vein mosaic and rust diseases of cowpea at K-block, GKVK, Bengaluru during *Kharif* -2015. Among them, 49 genotypes were found to be resistant, 12 genotypes were found to be susceptible, 08 genotypes were found to be moderately susceptible, 08 genotypes to be moderately resistant and 10 genotypes showed highly susceptible against mung bean yellow vein mosaic disease of cowpea. For rust disease, 25 genotypes showed highly resistant, 16 moderately susceptible, 17 highly susceptible reactions, whereas 15 genotypes were absolutely resistant and in remaining 14, 06 were of moderately resistant and 08 were susceptible against rust disease.
Keywords: Cowpea, Mungbean yellow vein mosaic, Rust, Genotypes

Introduction

Cowpea (*Vigna unguiculata* L. *Walp*.) is one of the most important pulse crop grown for green pods, green seeds and dry seeds. It is one of the most widely adapted, versatile and nutritious grain legumes (Venkatesan *et al*., 2003). Among the various diseases that threatening the production of cowpea, Yellow vein mosaic caused by Mungbean yellow vein mosaic virus and cowpea rust caused by *Uromyces phaseoli* var. *vignae* causes the huge loss to the producers, (Uma and Salimath, 2003). Hence the combination of the cultural measures and the use of resistant cultivars can reduce the disease problem and improve the profitability of crop production to a large extent. Therefore an attempt was made to identify the resistant source under natural ephiphytotic conditions.

Material and Methods

The experimental material consisted of 87 genotypes which were screened under natural disease pressure during *kharif* 2015. Each entry was sown in three rows of three meter length kept at 45 cm apart. The experiment was laid in RBD with three replications. The crop was raised following recommended package of practices. Observations were recorded at 45 DAS and 60 DAS for yellow vein mosaic and rust disease by counting the number of infected plants and the disease grading was done as per the 1-9 scale given by Singh *et al.* (1988) for yellow vein mosaic disease and 0-9 scale for rust disease as suggested by Mayee and Datar (1986) which are represented in Table 1&2.

Table 1 : Disease rating scale of Mungbean yellow mosaic virus in cowpea

Scale	Foliage affected	Description	Reaction
1	0.1-5%	Mottling of leaves on less than 1% plants	Resistant
3	5.1-10%	Mottling of leaves on 1.1-10 % plants	Moderately resistant
5	10.1-25 %	Mottling and yellow discoloration on 10.1-25% plants	Moderately susceptible
7	25.1-50%	Mottling and yellow discoloration of leaves on 25.1-50% plants	Susceptible
9	50.1-100 %	Severe yellow mottling on over 50% plants, stunting of plants and failure of flowering and fruit setting	Highly susceptible

Table 2 : Disease rating scale of Rust disease in cowpea

Scale	Foliage affected	Description	Reaction
0	Less than 1%	No pustules on the leaves	Absolute resistant
1	1-10%	Pustules are small, round, powdery brown uredospores covering 1 *per cent* or less than the leaf area	Highly Resistant
3	11-25%	Rust pustules covering 11 to 25 *per cent* of the leaf area	Moderately resistant
5	26-50%	26 to 50 *per cent* of the leaf area	Moderately susceptible
7	51-75%	51 to 75 *per cent* of the leaf area	Susceptible
9	More than 75%	75 *per cent* or more of the leaf area	Highly susceptible

Results and Discussions

In any crop production programme, one of the most important biotic stresses is due to disease incidences, which tend to affect the plant growth which in turn affects the productivity. Breeding for disease resistance varieties may tend to provide a long term remedy. So screening available genotypes for different disease reactions help the breeders to inculcate them as source for future breeding programmes. In regard of this, a field experiment was conducted under natural conditions during *Kharif* -2015 to screen 87 cowpea genotypes for mung bean yellow vein mosaic disease and rust disease.

Mung bean yellow vein Mosaic Virus

The reaction of different genotypes for mung bean yellow vein mosaic disease is presented in Table 3. Among the eighty seven genotypes, the highest number of genotypes (49) was resistant (Disease scale 1) and the least number were shared equally under moderately resistant and moderately susceptible class with eight genotypes respectively. Ten of them exhibited highly susceptible (Disease scale 9) and twelve genotypes of Disease scale 7 were noticed. Of the highly susceptible class of genotypes, some of the genotypes (IC-202781, C-152, IC-4506, IC-206240, IC-249593) were in agreement with the findings of Lesly (2005).

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Table 3 : Reactions of Genotypes to MYMV against Cowpea

SL No.	Genotype	MYMV (%)	Rating	Score	SL No.	Genotype	MYMV (%)	Rating	Score
1	IC-402090	0	1	R	**45**	IC-206240	90	9	HS
2	Genotype-36	20	5	MS	**46**	EC-170604	70	9	HS
3	NBC-30	0	1	R	**47**	IC-249593	90	9	HS
4	NBC-32	0	1	R	**48**	NBC-21	0	1	R
5	NBC-27	0	1	R	**49**	IC-402161	10	3	MR
6	IC-202781	90	9	HS	**50**	IC-402114	0	1	R
7	EC-472250	10	3	MR	**51**	IC-402101	40	7	S
8	ETC-27	0	1	R	**52**	IC-402106	0	1	R
9	EC-458473	0	1	R	**53**	202804(83)	60	9	HS
10	IC-1061	20	5	MS	**54**	EC-472252	0	1	R
11	IC-58905	10	3	MR	**55**	CB-10	0	1	R
12	C-152	90	9	HS	**56**	EC-458418	20	5	MS
13	EC-458505	0	1	R	**57**	IC-202825	0	1	R
14	NBC-21	0	1	R	**58**	IC-402180	70	9	HS
15	IC-402135	15	5	MS	**59**	NBC-44	0	1	R
16	NBC-12	0	1	R	**60**	V-585	10	3	MR
17	EC-458480	0	1	R	**61**	NBC-8	50	7	S
18	EC-458483	30	7	S	**62**	EC-458402	0	1	R
19	IC-458430	0	1	R	**63**	NBC-51	0	1	R
20	NBC-38	0	1	R	**64**	IC-402159	30	7	S
21	V-604-7-29-3	0	1	R	**65**	IC-402175	40	7	S
22	EC-170584	0	1	R	**66**	C-98	0	1	R
23	MBC-25	0	1	R	**67**	PKB-4-2	0	1	R
24	TOME-774	0	1	R	**68**	AV-2-2	20	5	MS
25	IC-202711	0	1	R	**69**	PKB-5	0	1	R
26	IC-249588	0	1	R	**70**	AV-6	0	1	R
27	EC-458473	20	5	MS	**71**	PV-1-4	0	1	R
28	C-24-1	0	1	R	**72**	PV-3-1	0	1	R
29	IC-4506	90	9	HS	**73**	AV-5-1	40	7	S
30	EC-458489	0	1	R	**74**	AV-2-1	0	1	R
31	EC-458438	0	1	R	**75**	PKB-3	0	1	R
32	27749(25)	50	7	S	**76**	PKB-1	0	1	R
33	IC-2591054	0	1	R	**77**	PKB-4	0	1	R
34	IC-25105	50	7	S	**78**	AV-1	20	5	MS
35	GC-3	0	1	R	**79**	PV-3	40	7	S
36	C-457	0	1	R	**80**	PV-1	0	1	R
37	C-720	0	1	R	**81**	PV-1-1	40	7	S
38	NBC-39	20	5	MS	**82**	PKB-2	80	9	HS
39	EC-402159	0	1	R	**83**	PKB-4-3	5	1	R
40	C-33	70	9	HS	**84**	AV-2-2	10	3	MR
41	EC-458490	40	7	S	**85**	AV-7	10	3	MR
42	IC-202777	10	3	MR	**86**	AV-6	10	3	MR
43	IC-402104	0	1	R	**87**	AV-5(BIG)	0	1	R
44	EC-458480	40	7	S					

Rust

The performance of cowpea genotypes against rust resistance is presented in Table 4. Out of eighty seven genotypes, fifteen were recorded to be Absolute resistant (Disease scale 0) to rust under field condition where as only eight genotypes were susceptible (Disease scale 7). The genotypes highly resistant (Disease scale 1), moderately resistant (Disease scale 3), moderately susceptible (Disease scale 5) and highly susceptible (Disease scale 9) were 25, 6, 16 and 17 respectively. These results were in line with the findings of Lesly (2005), Chandrashekar *et al*. (1989) and Cherian *et al*. (1996) for few genotypes.

Table 4 : Reactions of Genotypes to Rust against Cowpea

SL No.	Genotype	Rust (%)	Rating	Score	SL No.	Genotype	Rust (%)	Rating	Score
1	IC-402090	50	5	MS	**45**	IC-206240	20	3	MR
2	Genotype-36	60	7	S	**46**	EC-170604	10	1	HR
3	NBC-30	40	5	MS	**47**	IC-249593	5	1	HR
4	NBC-32	90	9	HS	**48**	NBC-21	70	7	S
5	NBC-27	10	1	HR	**49**	IC-402161	0	0	AR
6	IC-202781	70	7	S	**50**	IC-402114	5	1	HR
7	EC-472250	0	0	AR	**51**	IC-402101	20	3	MR
8	ETC-27	5	1	HR	**52**	IC-402106	5	1	HR
9	EC-458473	10	1	HR	**53**	202804(83)	20	3	MR
10	IC-1061	10	1	HR	**54**	EC-472252	70	7	S
11	IC-58905	40	5	MS	**55**	CB-10	0	0	AR
12	C-152	90	9	HS	**56**	EC-458418	0	0	AR
13	EC-458505	40	5	MS	**57**	IC-202825	90	9	HS
14	NBC-21	70	7	S	**58**	IC-402180	5	1	HR
15	IC-402135	80	9	HS	**59**	NBC-44	5	1	HR
16	NBC-12	20	3	MR	**60**	V-585	10	1	HR
17	EC-458480	30	5	MS	**61**	NBC-8	40	5	MS
18	EC-458483	100	9	HS	**62**	EC-458402	10	1	HR
19	IC-458430	80	9	HS	**63**	NBC-51	10	1	HR
20	NBC-38	80	9	HS	**64**	IC-402159	70	7	S
21	V-604-7-29-3	50	5	MS	**65**	IC-402175	10	1	HR
22	EC-170584	0	0	AR	**66**	C-98	0	0	AR
23	MBC-25	10	1	HR	**67**	PKB-4-2	30	5	MS
24	TOME-774	0	0	AR	**68**	AV-2-2	80	9	HS
25	IC-202711	0	0	AR	**69**	PKB-5	10	1	HR
26	IC-249588	90	9	HS	**70**	AV-6	20	3	MR
27	EC-458473	100	9	HS	**71**	PV-1-4	40	5	MS
28	C-24-1	10	1	HR	**72**	PV-3-1	50	5	MS
29	IC-4506	70	7	S	**73**	AV-5-1	30	5	MS
30	EC-458489	10	1	HR	**74**	AV-2-1	0	0	AR
31	EC-458438	5	1	HR	**75**	PKB-3	5	1	HR
32	27749(25)	10	1	HR	**76**	PKB-1	10	1	HR
33	IC-2591054	25	3	MR	**77**	PKB-4	5	1	HR
34	IC-25105	100	9	HS	**78**	AV-1	0	0	AR
35	GC-3	80	9	HS	**79**	PV-3	0	0	AR
36	C-457	90	9	HS	**80**	PV-1	40	5	MS
37	C-720	70	7	S	**81**	PV-1-1	0	0	AR
38	NBC-39	90	9	HS	**82**	PKB-2	0	0	AR
39	EC-402159	5	1	HR	**83**	PKB-4-3	50	5	MS
40	C-33	10	1	HR	**84**	AV-2-2	50	5	MS
41	EC-458490	80	9	HS	**85**	AV-7	0	0	AR
42	IC-202777	80	9	HS	**86**	AV-6	0	0	AR
43	IC-402104	30	5	MS	**87**	AV-5(BIG)	50	5	MS
44	EC-458480	80	9	HS					

Conclusions

Overall, the genotypes that were found to be resistant against yellow vein mosaic virus (49 genotypes) and rust (25 genotypes) disease can be used as parents for future disease resistance breeding programs. Screening of genotypes for different diseases under natural epiphytotic conditions may help in exploiting the available resources for better crop production against different biotic stresses, thereby increasing the yield levels as well as farmers income.

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